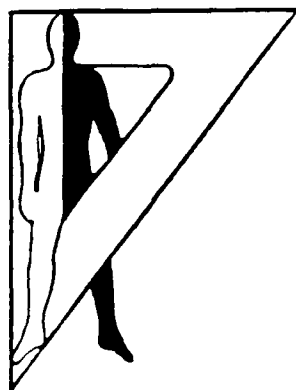


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Technical Note 1-89

**HUMAN ENGINEERING LABORATORY
SUPPORT OF MANPRINT**

PROGRESS REPORT

John D. Weisz

February 1989
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19 ABSTRACT (Continue on reverse if necessary and identify by block number) This report describes the progress that the U.S. Army Human Engineering Laboratory (HEL) has made over the years towards the implementation of a U.S. Army program to integrate the various aspects of manpower, personnel, training, safety and health hazards, and human factors into the materiel development process. This document traces the history of Manpower and Personnel Integration (MANPRINT) back to the late 1960s during which time the HEL published several reports that laid the foundation for MANPRINT and detailed some of the actions required throughout the materiel development cycle for a program such as MANPRINT to be successful. It is indeed fortunate that we had such leaders in the mid 1980s as the Honorable Delbert L. Spurlock, Assistant Secretary of the Army for Manpower and Reserve Affairs; General Max Thurman, then Vice Chief of Staff of the U.S. Army; and others who recognized the need for such a program (MANPRINT), directed its early implementation efforts, and have supported it strongly ever since. The ball is back in our court now to make sure that MANPRINT is institutionalized throughout the Army. The HEL stands ready and able to assist in making this institutionalization occur.					
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HUMAN ENGINEERING LABORATORY
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PROGRESS REPORT

In the 4 March 1968 version of Army Regulation (AR) 602-1, titled *Man-Materiel Systems - Human Factors Engineering Program*, human factors engineering (HFE) is defined as a "comprehensive technical effort to integrate all manpower characteristics (personnel skills, training implications, behavioral reactions, human performance, anthropometric data, and biomedical factors)" into Army doctrine and systems to ensure operational effectiveness, safety, and freedom from health hazards.

In the updated AR 602-1 (1 June 1976), Figure A-1 of the Appendix details further the personnel considerations in system effectiveness as shown in Figure 1 below:

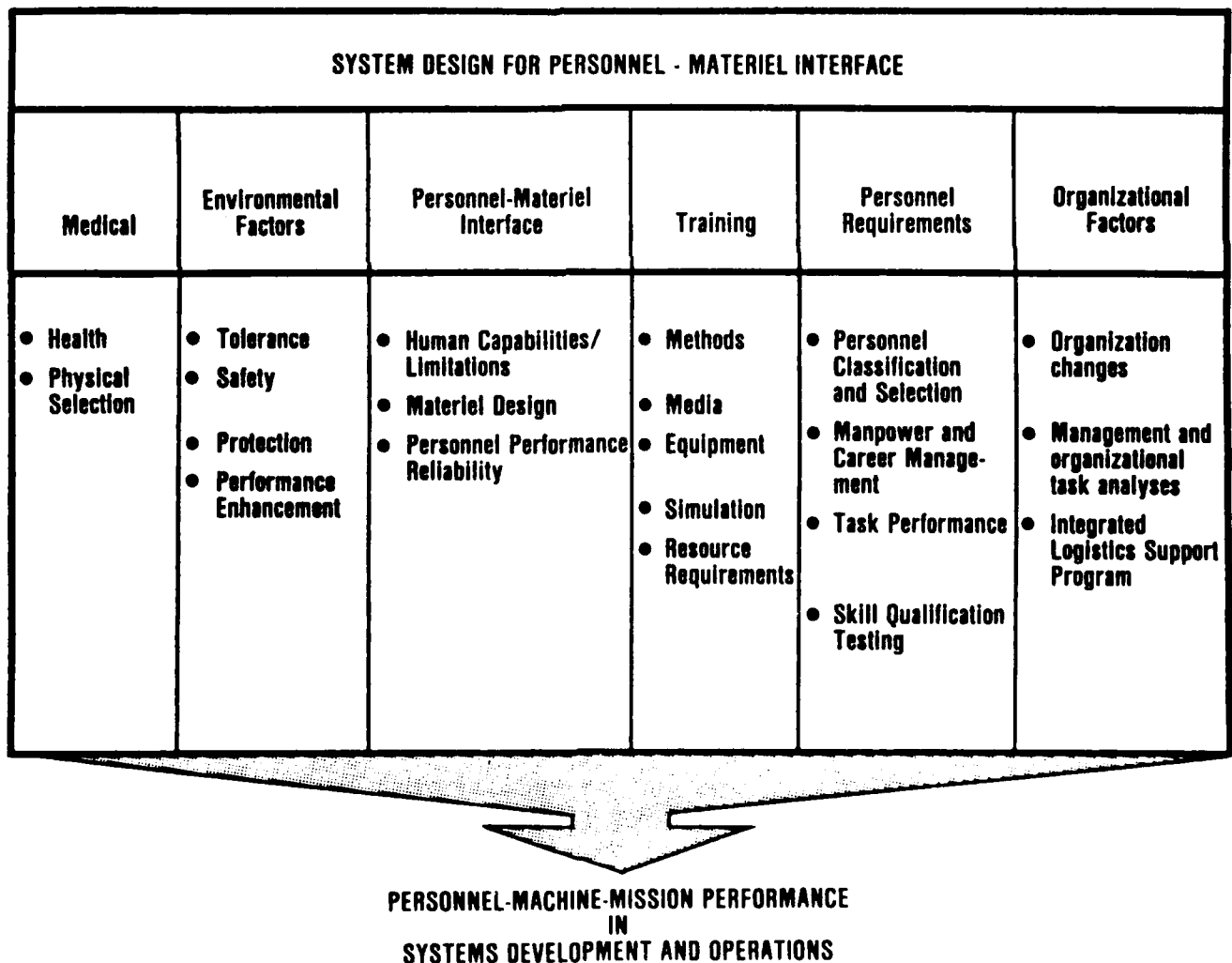


Figure 1. Personnel considerations in system effectiveness.

In Chapter 2 of the 15 February 1983 revision of AR 602-1, HFE is defined as a "comprehensive technical effort to integrate into Army doctrine, materiel development, and materiel acquisition (to insure operational effectiveness) all relevant information concerning--

- a. Human characteristics.
- b. Skill capabilities.
- c. Performance.
- d. Anthropometric data.
- e. Biomedical factors.
- f. Safety factors.
- g. Training.
- h. Marning implications."

Two HEL reports (*System Analysis: Human Factors Research and Development Contributions* [TN 6-67, July 1967] and *System Analysis: Manpower Resources/System Design Integration Methodology* [TN 9-68, August 1968]) established the general framework around which manpower factors could be effectively included and appropriately weighted in materiel development programs.

Implementing documents such as HEL Guide 1-69, titled *Manpower Resources Integration Guide for Army Materiel Development* (30 January 1969) and later in another document, titled *Human Factors Engineering in Research, Development and Acquisition* published by the U.S. Army Human Engineering Laboratory (31 October 1980), carefully laid out a management model with explanations to assist all concerned in assuring and managing consideration of the human role in materiel system development. This latter document was prepared specifically at the request of Generals Kerwin and Blanchard during their 1979-1980 study, after they had been shown HEL Guide 1-69, which by then had become outdated due to changes in the materiel acquisition process. Unfortunately, those with power in the Army at that time (1969-1980+) did not see the necessity to endorse these human factors engineering pioneering endeavors to establish a concerted effort to integrate all soldier-related attributes or characteristics into the materiel development process, despite the prodding that those of us in the field devoted to getting such an effort going.

Thus, it wasn't until 1984 when General Thurman, then Vice Chief of Staff of the Army, directed Lieutenant General Robert Elton, then Deputy Chief of Staff for Personnel (DCSPER), to establish an office within DCSPER to become the focal point within the Army to integrate all manpower, personnel, training, safety, biomedical, and human factors into materiel systems development programs that significant progress began to be made.

On 17 October 1984, I got my marching orders with regard to this integrating function when General Richard H. Thompson, Commander, U.S. Army Materiel Command, sent me a letter that clearly defined the role of the U.S. Army Human Engineering Laboratory when he stated that "the Vice Chief of Staff of the Army recently approved my action plan that will put our Manpower and Personnel Integration (MANPRINT) on all developmental systems. What is MANPRINT? MANPRINT is the process of imposing human factors, manpower, personnel and training considerations on the entire materiel acquisition process."

In paragraph 3 of that letter General Thompson stated, "From this point forward, I want you to raise MANPRINT considerations above system design. This nation's great capacity to develop and apply exotic technologies must be harnessed to turn that technology to human considerations. We still want the most capable equipment, but let's use technology to make that equipment easier to operate and maintain." General Thompson further stated, "Thus you, because of your position and responsibilities, are part of the vanguard of this effort...."

Taking this directive seriously, the U.S. Army Human Engineering Laboratory has initiated and implemented a number of actions to improve its human factors engineering capability throughout the U.S. Army Materiel Command (AMC) and U.S. Army Training and Doctrine Command (TRADOC) in support of MANPRINT.

Some of these actions include the following:

- established a MANPRINT Office (Mr. Michael Golden, Chief, COMM: (301) 278-5830 or AV 298-5830);
- assisted in establishing the MANPRINT training courses;
- published HEL Technical Memorandum 13-86, *Human Factors Engineering Material for Manpower and Personnel Integration (MANPRINT) Provisions of the Request for Proposal (RFP)*; HEL Technical Memorandum 6-87, *Human Factors Engineering Data Management Handbook*; and HEL Guide 1-88, *Human Factors Engineering Task Analysis Guidelines*;
- promoted MANPRINT through many briefings to key Army, Navy, Air Force, and industry visitors to the HEL;
- sponsored a specific MANPRINT Industry Day;
- participated in AMC MANPRINT executive seminars and in DCSPER MANPRINT/industry executive seminars; and most importantly of all,
- increased the professional man-years devoted exclusively to human factors engineering in support of implementing MANPRINT on specific materiel development programs throughout AMC and TRADOC to 75± during fiscal year 1989.

These personnel are on-site at the AMC major subordinate commands (MSCs), where the program executive officers (PEOs) and program manager (PM) offices are collocated, and at the TRADOC Centers and Schools where materiel requirements documents and system manpower management plans (SMMPs) are developed. Further, the HEL personnel at Aberdeen Proving Ground directly support the TRADOC Centers and Schools and AMC MSCs prior to Milestone 1 on a variety of soldier-equipment interface feasibility studies and field experiments where the major features of a proposed materiel equipment design are simulated in the laboratory or in the field to determine the accuracy and/or efficacy with which soldiers can operate the proposed equipment. Recent examples of these are the Light Helicopter Family

(LHX); Advanced Field Artillery System (AFAS); Advanced Antitank Weapon System - Medium (AAWS-M); Advanced Combat Rifle (ACR); M1 Block III Improvements; Armored Family of Vehicles (AFV); protective masks; nuclear, biological and chemical (NBC) clothing; and the Command Post Vehicle.

The HEL detachment and field personnel are serving as MANPRINT engineers. They are serving on the design team of the project managers to "raise MANPRINT considerations above system design" as General Thompson charged us to do. Even though they are not experts in all of the domains of MANPRINT, they serve as advocates for ensuring that the various domains of MANPRINT are included in materiel system designs. If a particular domain such as safety or training is not adequately addressed, I expect my people to point that out to the PMs and/or designers so that corrective action can be taken before the design is in place.

It is important to emphasize that MANPRINT is a process, nothing more, nothing less. It consists of a series of actions, changes, or functions that achieve the desired result. The desired result in this case is a materiel system that our current and future soldiers can effectively operate and maintain in a dirty, stressful combat environment. Furthermore, implementing MANPRINT does not mean just waving a magic wand over a materiel system design--it really means getting into the design business in detail to ensure that the human element is considered equally along with all of the other important design constraints of Army materiel.

The bottom line to all of this is that the human factors engineering program in the AMC is alive and well, increasing in strength and more relied on and appreciated every day. The HFE program will be asked to perform at an even higher level of effectiveness in the future. After 35 years of maturation, we have attained the level of professionalism that is needed to deliver our product--that product being the best and most effective materiel possible for our soldiers in the field.

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